

REMARKS

Reconsideration of this application as amended is respectfully requested.

Claim 13 has been amended to more clearly distinguish patentable subject matter over the cited references. As amended, claim 13 recites a piston ring having an HVOF-applied layering on its operating face with a surface roughness factor $R_k < 0.12\mu\text{m}$ and a porosity $< 5\%$. Claim 13 further recites the limitations of now canceled claim 19, wherein at least one of the upper and lower faces of the ring as having a trapezoidal form adjacent the operating surface provided with a galvanic protective layer.

As noted in the previous response, the distinction of the very low porosity level $< 5\%$ and the very smooth surface $R_k < 0.12\mu\text{m}$ of the HVOF-applied layering is important since they act together to inhibit the penetration of corrosive electrolytes that the layering gets exposed to when the galvanic protective layer on one or both top and bottom faces of the piston ring is applied. The $< 5\%$ porosity and surface roughness factor $< 0.12\mu\text{m}$ combine to prevent the penetration of the acidic electrolyte into the layering on the operating face, particularly given the trapezoidal form of at least one of the upper and lower faces to which the galvanic protective layer is applied.

Neither JP '048 or Obara teach or suggest controlling the porosity and surface roughness at the level claimed to achieve the desired resistance to the penetration of acidic electrolyte during galvanic application of the chrome layer on the upper and lower faces, let alone the trapezoidal form of at least one of the upper and lower faces to which the galvanic protective layer is applied in combination therewith.

As such, as further noted in the previous response, the claimed porosity level and surface roughness factor is not just an optimum working level provides more than the mere benefit of providing excellent resistance to wear as well as scuffing and peeling resistance. Rather, these unique combination of features prolong the life of piston rings by avoiding penetration of galvanic electrolytes during application of the galvanic protective layer on one or both of the top and/or bottom faces of the ring, particularly given the trapezoidal form of the top and/or bottom face adjacent the operating surface to which the galvanic layer is applied. This is neither taught nor suggested by JP '048 alone or in combination with Obara. Accordingly, allowance of amended claim 13 is respectfully requested.

Claims 14-17 and 21-22 are ultimately dependent upon amended claim 13, and thus are believed to recite patentable subject matter for at least the same reasons. Claim 21 has been amended to change its dependency from now canceled claim 20 directly to amended claim 13. Claim 21 has been further amended to recite the chrome-based material as being applied on the trapezoidal form immediately adjacent the operating surface. This, in combination with the limitations of amended claim 13, is not shown, disclosed or otherwise suggested in any of the applied references. Accordingly, allowance of these claims is respectfully requested.

Claim 23 has been amended in similar manner as claim 13 to further define patentable subject matter over the cited references. As amended, in addition to the unique combination of surface roughness and surface finish of the layering provided by the HVOF process to resist the penetration of acidic electrolyte during galvanic application of the chrome layer on the upper and lower faces, claim 23 further includes forming at least part of an upper and lower surface of the individual rings adjacent the operating surface into a trapezoidal shape and applying a galvanic layer over the trapezoidal areas. Accordingly, for at least the same reasons given above in support of amended claim 13, it is respectfully submitted that claim 23 distinguishes applicants invention patentable over JP '408 alone or in combination with Obara and should be allowed.

It is believed that this application now is in condition for allowance. Further and favorable action is respectfully requested.

The Patent Office is authorized to charge or refund any fee deficiency or excess to Deposit Account No. 04-1061.

Respectfully submitted,

DICKINSON WRIGHT PLLC

May 14, 2008
Date

/John D. Wright /
John D. Wright, Registration No. 49,095
38525 Woodward Avenue, Suite 2000
Bloomfield Hills, Michigan 48304-2970
(248) 433-7390